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Learning in the age of algorithmic cultures

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Abstract

This Editorial describes the main challenges at the intersections between algorithmic cultures and human learning. It briefly analyses papers in this Special Issue of *E-learning and Digital Media* ‘Learning in the age of algorithmic cultures’ and shows that researchers in the field are still struggling with grand ideas and questions. It suggests that studies of algorithms and learning are in their infancy and emphasizes that they carry potentials to confirm our existing ideas and surprise us with fresh insights.

Keywords

Algorithms, big data, educational data science, educational research, Learning Analytics, posthumanism

During the past decades, algorithms have become ubiquitous actors in the global economy as well as our social and material worlds. Slowly but surely we have entered the age of algorithmic cultures which, following Daniel Dennett’s (2017) analysis, affords the possibility of the transmission of material and social culture through language into the cultural arena in which cultural artefacts take on agency. In education studies, algorithmic cultures signal a shift away from the centrality of individual or social concerns and toward the complex relations between the human and nonhuman agencies that proliferate in our digitally networked activities. Research in this context is likely to foreground what algorithms do rather than what they describe or analyse, and recant calls for critical studies in this area have highlighted the need for multi-faceted approaches that examine both the production of software and code, and their influence ‘in the world’ (Kitchin, 2017: 25). Effects, products and worlds created by algorithms have their own kind of power, giving this work a political dimension, as well as a philosophical and ethical one. Educational concerns are growing, where critical research has the capacity to surface the ‘cultural and political tendencies that are enfolded in the drive for efficiency that pervades institutional education’ (Knox, 2015: 5). In this Special Issue, guest editors Petar Jandric, Jeremy Knox, Hamish Macleod and Christine Sinclair have invited authors to explore the intersections between algorithmic cultures and human learning.

In the first paper, 'Who owns educational theory? Big data, algorithms and the politics of education data science', Ben Williamson analyses two important institutions for algorithm research: Stanford University's Lytics Lab, specialised in learning analytics, and Pearson's Center for Digital Data, Analytics and Adaptive Learning, specialised in educational big data. Based on these analyses, Williamson develops an important central argument that educational data science has moved from non-profit academic laboratories to for-profit companies and explores dire consequences of such developments. The second paper, 'Economizing education: assessment algorithms and calculative agencies' by Cormac O'Keeffe, explores the relationships between the human and non-human agents in the testing software for the Programme for the International Assessment of Adult Competencies (PIAAC). He moves on to examine the role of various psychometric practices and testing theories, in particular item response theory, and their ability to link literacy practices and calculable psychological constructs. O'Keeffe suggests that large-scale digital assessments such as PIAAC do not merely produce data about ability – more importantly, they 'perform the concept of ability into being'. While there is no doubt that data-driven approaches to large-scale assessment can provide states and companies with valuable inputs, concludes O'Keeffe, data and the technologies used to produce these inputs profoundly influence their results. The third paper, Paul Prinsloo's 'Fleeing from Frankenstein and meeting Kafka on the way: algorithmic decision-making in higher education', reflects a similar sentiment: while there is no doubt that algorithmic decision-making offers huge potential, the paper focuses to the associated risks and ethical concerns. Prinsloo maps seven dimensions of how higher education institutions collect, analyse and use student data: (1) automation; (2) visibility; (3) directionality; (4) assemblage; (5) temporality; (6) sorting and (7) structuring. Using these dimensions, he proposes a number of suggestions for using algorithms in higher education from a position of an ethics of care.

The fourth paper, 'Disrupting the dissertation: linked data, crowd-sourcing and algorithmic culture' by Fran Tracy and Patrick Carmichael, explores the influence of the three aspects of Striplhas' notion of algorithmic culture (information, crowds and algorithms) to established educational practices. As part of a large funded research project 'Ensemble: Semantic Technologies for the Enhancement of Case Based Learning' (Carmichael et al., 2012; Martinez-Garcia et al., 2012), the article focuses to a specific pedagogical setting in undergraduate archaeology. Within this setting, Tracy and Carmichael explore the changing relationships between subject, content and (student, teacher and public) practices. They identify some opportunities, yet warn 'how the unpredictability of crowds, the variable nature and quality of data, and the often hidden power of algorithms, introduce new pedagogical challenges and opportunities'. The last paper in this Special Issue, Gerald Argenton's 'Mind the gaps: controversies about algorithms, learning and trendy knowledge', claims that algorithms are primarily tools for learning and knowledge development which constitute a certain rationality-based socio-cultural context. He claims that many definitions in the field of algorithm studies are 'blind to the ambiguity and slipperiness of contexts, hiding the gaps and protrusions that

hinder the objective circumscription of a concept'. He identifies three important gaps for learning in the age of algorithmic cultures: (1) gaps between problems and solutions; (2) gaps within the binary 'with or without' algorithmic tools and (3) gaps between expectations from algorithms and the actual social condition. Relying on contextual relatedness of the contemporary Web, Argenton explores possibilities for bridging these gaps and enriching human learning in the age of algorithmic cultures.

Authors in this Special Issue identify numerous hopes and problems hidden within the curious relationships between algorithms, teaching and learning. Yet, they do not succumb to despair because of negative trends such as corporate takeover of educational data science (although there are many reasons to despair!) and they are not overly seduced by positive trends such as the unprecedented ability for large-scale research (although researchers in many fields of education increasingly rely on educational data science). After the brief historical phase of hope that algorithms and big data can provide new solutions to educational problems, and after the sobering phase when we collectively realised problems associated with such solutions, educational data science seems to be at the brink of a more mature phase where we actively seek compromise, balance and appropriate solutions for the moment here and now.

Studies of algorithms and learning are in their infancy, and we are still struggling with grand ideas and questions. How should we define the algorithm? What are studies of algorithms and learning; how should we approach them? Authors in this Special Issue have asked several variants of Ben Williamson's (2016) question: Who owns educational theory in the age of algorithmic cultures? Throughout the five papers in this Special Issue, the authors managed to approach these questions from various perspectives: analytical, historical, numerical and even fictional. Such richness and variety of resources may indicate lack of maturity of educational data science; it may also point towards a deeper post-disciplinary logic in the field (see Jandric, 2016 and 2017). As a new research area, studies of algorithms and learning carry potentials to confirm our existing ideas and surprise us with fresh insights; to destroy old dogmas and create new ones. Papers in this Special Issue clearly reflect this vast space of opportunity, and suggest that our collective journey into studies of algorithms and learning has just begun.

References

- Carmichael P, et al. (2012) Semantic Technologies for the Enhancement of Case-Based Learning: ESRC End of Award Report, RES-139-25-0403-A. Swindon: ESRC.
- Dennett D (2017) From Bacteria to Bach and Back: The Evolution of Minds. New York: W. W. Norton & Company.
- Jandric, P (2016) The methodological challenge of networked learning: (Post)disciplinarity and critical emancipation. In: T Ryberg, C Sinclair, S Bayne, et al. (eds) Research, Boundaries, and Policy in Networked Learning. New York: Springer.
- Jandric, P (2017) Learning in the Age of Digital Reason. Rotterdam: Sense.
- Kitchin R (2017) Thinking critically about and researching algorithms. Information,

- Communication & Society 20(1): 14–29. DOI: 10.1080/1369118X.2016.1154087
- Knox J (2015) Digital cultures and education. Springer Encyclopaedia of Educational Theory and Philosophy. Available at: http://link.springer.com/referenceworkentry/10.1007/978-981-287-532-7_124-1 (accessed 7 July 2017).
- Martinez-Garcia A, Morris S, Tscholl M, et al. (2012) Case-based learning, pedagogical innovation, and semantic web technologies. IEEE Transactions on Learning Technologies 5(2): 104–116.
- Williamson B (2016) Who owns educational theory? Pearson, big data and the ‘theory gap’. Available at: <https://codeactsineducation.wordpress.com/2016/01/19/who-owns-educational-theory/> (accessed 7 July 2017).